

LETTERS TO THE EDITOR

Regarding “Impact of practice patterns in shunt use during carotid endarterectomy with contralateral carotid occlusion”

We read the article by Goodney et al¹ with great interest. They report the results of carotid endarterectomy (CEA) in a large selected group of 353 patients with contralateral carotid occlusion (CCO). In their discussion, the authors report that their study refuted their hypothesis that shunt use would be associated with better outcomes for CEA in the setting of CCO. They conclude that shunt use is not a useful quality measure with which to measure and improve performance because surgeons can achieve excellent outcomes with or without using a shunt.

It is interesting to note that surgeons who use a shunt infrequently during any CEA (<30%) have higher rate of stroke/death when treating patients with a CCO with a shunt. Could shunt use be a risk factor for stroke for these selective surgeons, causing stroke from emboli during shunt placement or retrieval? Should selective surgeons abandon their shunt or are the “selected shunted patients” at a higher risk of ischemic stroke and better treated with a shunt? Although this study will not answer these questions, it reopens the debate on the role of shunt use in CEA.

Available evidence is too limited to support or refute the use of any shunting strategy during CEA.² From routine or selective shunting to routine nonuse of shunting, regional variation of shunt use during CEA is important. The General Anaesthesia Versus Local Anaesthesia for Carotid Surgery (GALA) trial reported that as many as 26% of non-United Kingdom surgeons never used a shunt under general anesthesia during the GALA trial, with stroke and death rates similar to those of their colleagues.^{3,4}

Our questions for the authors relate to the type and timing of the 14 strokes encountered: Were they embolic, ischemic from carotid thrombosis, or watershed stroke? Were they noticed immediately after the operation or later? What did cerebral imaging reveal in these 14 patients with postoperative stroke? If watershed stroke was found, was the carotid repair patent and were these patients shunted?

It would also be interesting to know the numbers of patients operated by each surgeon and whether volume differed between both groups. Was their any outlier's surgeon affecting the results of each group?

We congratulate the authors for this interesting study and the Vascular Study Group of New England, a great step toward evidence based vascular surgery.

Stephane Elkhouri, MD, MSc, FRCSC

Division of Vascular Surgery
Centre hospitalier de l'Université de Montréal, Hôtel-Dieu
Montreal, Quebec, Canada

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Reply

We appreciate the interest expressed in our article. The questions expressed in the letter to the editor surround the type and timing of the 14 strokes encountered in our cohort as well as the effect of surgeon volume on outcomes in our study.

In response to the first question, we found that the timing of the 14 strokes varied (Table). The distribution of the timing of the strokes was fairly even: three occurred intraoperatively, six ≤6 hours after surgery, three >6 hours after surgery, and the last two after discharge. There was no clear relationship with the presence or absence of a shunt or with the type of shunt used.

No arteries underwent intraoperative re-exploration at the time of the initial index carotid endarterectomy (CEA). Five of the 14 patients returned to the operating room postoperatively, however, and three of these 14 patients died before discharge. The 11 survivors all had patent carotid arteries at 1-year follow-up, although one patient had a restenosis >70%. Unfortunately, computed tomography imaging for these patients is beyond the scope of our database at present.

When we looked at the association between surgeon volume and practice patterns in shunt use, we noted two interesting trends. First, surgeons who selectively placed shunts performed more CEAs (both overall and in CEAs with contralateral carotid occlusions) compared with surgeons who routinely placed shunts, by a difference of ~20% to 30%. Despite this difference, we did not detect a volume-outcome effect by surgeon practice pattern.

Further, for both selective and routine practice patterns, there were surgeons who had a “very high” volume, contributing >60

Table I. Timing of the strokes

When did the stroke occur?	Patients (No.)	Was a shunt used?	Did the patient return to the operating room?
Intraoperatively	3	2 routine, 1 for indication	2 patients for bleeding
≤6 hours post-op	6	3 not shunted, 2 routine, 1 for indication	2 patients for neurologic changes
>6 hours post-op	3	1 not shunted, 1 routine, 1 for indication	1 patient for neurologic changes
<30 days after discharge	2	2 routine	No